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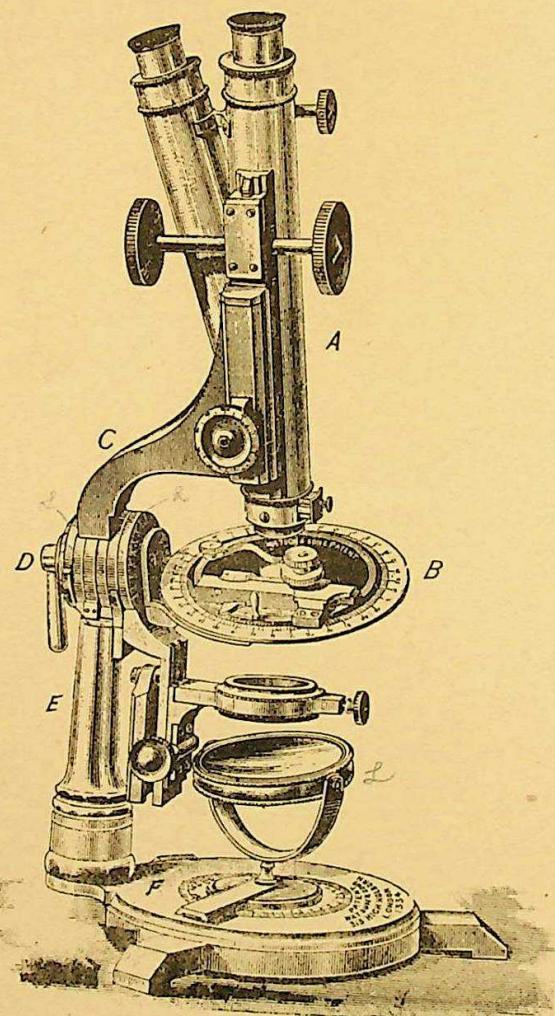
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Microscopes

A.D.1880. DEC. 22 N°5392.
MOSS' SPECIFICATION.

(1 SHEET)



Malby & Sons, Photo-Litho.

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A.D. 1880, 22nd DECEMBER. N° 5392.

Microscopes.

LETTERS PATENT to John Matthew Moss, of Patricroft, near Manchester, in the County of Lancaster, for an Invention of "IMPROVEMENTS IN MICROSCOPES."

PROVISIONAL SPECIFICATION left by the said John Matthew Moss at the Office of the Commissioners of Patents on the 22nd December 1880.

JOHN MATTHEW MOSS, of Patricroft, near Manchester, in the County of Lancaster. "IMPROVEMENTS IN MICROSCOPES."

5 This Invention relates to improvements in microscopes, and consists of a method of mounting the body or portion carrying the lenses on a stand so constructed as to be capable of presenting the instrument together with the object in every possible position with regard to an illuminating ray proceeding in a fixed direction, so that every possible variety of illumination from direct front light to the last degree of 10 obliquity at which a ray of light will enter a surface of glass can be obtained without the interposition of any substage or other subsidiary apparatus whatever, and without once losing sight of the object or the light. To effect this I mount the body together with the stage upon an arm capable of rotation in a vertical plane, the centre of which rotation is exactly in a horizontal line with the object when 15 the latter is in the focus of the objective. In other words the line of rotation of the body and stage is exactly in the focal plane of the objective.

The cradle or other joint upon which the instrument turns to effect this is attached by means of a pillar or pair of pillars to a horizontal rotating plate, the centre of rotation of which is exactly beneath and in a line with the optical axis of 20 the microscope when the instrument is in a vertical position.

I thus obtain two motions, one in altitude the other in azimuth, so related to each other as to be capable, when used separately or in combination, of presenting the object together with the body in any position towards a ray of light proceeding from a fixed point or in a fixed direction. This ray I obtain by means either of a 25 lamp, a mirror, or a prism attached to a bar which slides to and fro in a fitting so attached to the base plate of the microscope as to be capable of independent rotation round the same centre as the rotating horizontal plate before mentioned, which gives to the microscope its motion in azimuth.

[Price 6d.]

Moss' Improvements in Microscopes.

The stage of this microscope may be either plain or mechanical. The latter may be constructed as usual or in the following manner which I prefer and claim as a new Invention:—

In the lower plate of the stage, which I construct in the usual way to rotate round a line passing through the optical axis of the microscope, I plough or 5 otherwise cut sufficiently deep a dovetailed groove or channel passing across the plate parallel with its diameter. Into this groove or channel I fit a sliding plate, perforated in its centre and carrying near one corner (preferably the lower right hand one) a rotating pinion with its axis vertical. The teeth of this pinion gear into those of a rack cut into or attached to one side of the above channel, and 10 fastened to the upper end of the rod forming its axis is a milled head, by means of which it can be turned against the rack and so move the upper plate together with the pinion in a straight line across the lower one. In this upper plate I likewise plough or otherwise cut a similar channel to that in the lower one, but in a 15 direction at right angles to the latter and fit into it a second sliding plate, cut into or attached to the lower edge of which is a rack whose teeth gear into those of a second pinion turning upon the same axis as the first, and by means of a tube enclosing the rod of the latter carrying a second milled head placed below the first. To this top plate I attach the springs or other appliances necessary for holding the 20 slide containing the object to be viewed. By turning the lower of the two milled heads I have the horizontal, by turning the upper the vertical motion, and by turning both at once a diagonal motion. I thus make a very thin mechanical stage whose range of motion is very much greater than the old forms allow, and the peculiar position of the milled heads of which standing vertically upon it allows of a complete rotation of the stage. 25

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said John Matthew Moss in the Great Seal Patent Office on the 22nd June 1881.

JOHN MATTHEW MOSS, of Patricroft, near Manchester, in the County of 5 Lancaster. "IMPROVEMENTS IN MICROSCOPES."

This Invention relates to improvements in microscopes, and consists of a method of mounting the body or portion carrying the lenses and the stage on a stand so constructed as to be capable of presenting the instrument together with the object in every possible position with regard to an illuminating ray proceeding in a fixed 10 direction, so that every possible variety of illumination from direct front light to the last degree of obliquity at which a ray of light will enter a surface of glass can be obtained without the interposition of any substage or other subsidiary apparatus whatever, and without once losing sight of the object or the light.

The accompanying Drawing represents a perspective view of my improved 15 microscope.

To effect the object of my Invention I mount the body A together with the stage B upon an arm C capable of rotation in a vertical plane, the centre of which rotation is exactly in a line with the object placed on the stage when the object is 20 in the focus of the objective. In other words the centre of rotation of the body and stage is exactly in the focal plane of the objective.

The cradle (or other) joint D upon which the instrument turns to effect this is attached by means of a pillar E or pair of pillars to a horizontal rotating plate F, fixed to and rotating upon the foot of the instrument, the centre of rotation of 25 which plate is exactly beneath and in a line with the optical axis of the microscope when the body of the instrument is in a vertical position. I thus obtain two motions, one in altitude the other in azimuth, so related to each other as to be capable when used separately or in combination of presenting the object together with the body in any position towards a ray of light proceeding from a fixed point or in a fixed direction.

30 This ray I obtain by means either of a lamp, a mirror, or a prism attached to a bar which slides to and fro in a fitting so attached to the base plate of the microscope as to be capable of independent rotation round the same centre as the rotating horizontal plate F before mentioned, which gives to the microscope its motion in azimuth.

35 The stage of this microscope may be either plain or mechanical. The latter may be constructed as usual, or in the following manner, which I prefer and claim as a new Invention.

In the lower plate of the stage, which I construct in the usual way to rotate 40 round a line passing through the optical axis of the microscope, I plough or otherwise cut sufficiently deep a dovetailed groove or channel passing across the plate parallel with its diameter. Into this groove or channel I fit a sliding plate perforated or cut away in its centre and carrying near one corner (preferably the lower 45 right hand one) a rotating pinion with its axis vertical. The teeth of this pinion gear into those of a rack cut into or attached to one side of the above channel, and fastened to the upper end of the rod forming its axis is a milled head, by means of which it can be turned against the rack and so move the upper plate together with the pinion in a straight line across the lower one.

In this upper plate I likewise plough or otherwise cut a similar channel to that 50 in the lower one, but in a direction at right angles to the latter, and fit into it a second sliding plate, cut into or attached to the lower edge of which is a rack whose teeth gear into those of a second pinion turning upon the same axis as the first, and by means of a tube enclosing the rod of the latter carrying a second

Moss' Improvements in Microscopes.

milled placed below the first. To this top plate I attach the springs or other appliances necessary for holding the slide containing the object to be viewed.

By turning the lower of the two milled heads I have the horizontal, by turning the upper the vertical motion, and by turning both at once a diagonal motion. I thus make a very thin mechanical stage, whose range of motion is very much greater than the old forms allow, and the peculiar position of the milled heads of which standing vertically upon it allows of a complete rotation of the stage.

Having described the nature of the said Invention, and the manner of performing the same, I declare that what I claim as the Invention to be protected by the hereinbefore in part recited Letters Patent is,—

1st. Mounting the body of the microscope together with the stage upon a stand so constructed as to permit of their rotation about two axes, so arranged with regard to each other and to the other parts of the instrument that the body and stage may be presented at any angle to a fixed ray of light, substantially as herein specified and illustrated in the Drawings.

2nd. In a mechanical stage the combination of two pinions on the same vertical axis with two racks at right angles to one another operating independently or in combination to impart motion in any direction to the slide, substantially as herein specified.

In witness whereof, I, the said John Matthew Moss, have to this *Specification* set my hand and seal, this 17th day of June, A.D. 1881.

JOHN MATTHEW MOSS. (L.S.)

Witness to signature,

SAMUEL MELLOR,
Patricroft,
Lancashire.

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